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ABSTRACT

This study, conducted over a period of three weeks at the University of Kansas, attempted to determine whether knowledge of musical structure would effect greater understanding and, eventually, enjoyment of music. Experimental and control groups comprising freshmen who were not enrolled in a music course listened repeatedly to excerpts of classical, light classical, broadway show, ballad, jazz, rock 'n' roll, folk, and country-western music. The students' verbal discriminations of musical structure were taped as they commented while listening to the music, and nine preference ratings were obtained for each excerpt. Discrimination scores concerning the structural elements of two classical selections and a numerical compilation showing the frequency of discrimination for four selections were also obtained. For the two groups, the relationship between increased awareness of musical structure and positive affective response was fairly high for one classical work and moderately low for another. This relationship appears significant, since classical music is not closely related to the musical tastes of today's university-age person. The influence of discrimination on musical preference seemed apparent when a second control group did not react as positively to the classical excerpts as did the other group. Although it is felt that the method used in this study seemed to establish some positive changes in listening habits among the subjects, further research would help to determine its utility for the teaching of discriminative listening in the general music curriculum. (WM)

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FINAL REPORT

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THE EFFECT OF REPEATED LISTENINGS ON ABILITY TO RECOGNIZE THE STRUCTURAL ELEMENTS OF MUSIC AND THE INFLUENCE OF THIS ABILITY ON AFFECTIVE SHIFT

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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D. L. B.

THE EFFECT OF REPEATED LISTENINGS ON ABILITY TO RECOGNIZE THE STRUCTURAL ELEMENTS OF MUSIC AND THE INFLUENCE OF THIS ABILITY ON AFFECTIVE SHIFT

Summary

Statement of the Problem. It is generally believed that knowledge of the structural elements of music is basic to musical understanding and, eventually, musical enjoyment. There is yet little objective evidence, however, that demonstrates the extent to which awareness of these elements influences one's enjoyment of music. It was the purpose of this study to investigate that aspect of musical behavior which involves the discrimination of musical structure and to determine some relationships between this discrimination and preference for certain types of classical and popular music.

Procedure. University nonmusic students in experimental and control groups listened repeatedly to two selections of classical music and two selections of best-liked music (popular) at nine sessions over a period of three weeks. Nine preference ratings were obtained from each subject for each selection. Also, tape recordings were made of the Experimental Group subjects as they reported their discriminations of musical structure while listening to the music. A second control group was given only a pre-posttest along with the other two groups; a total of 149 subjects was used. Appropriate statistical analysis was applied to the data.

Findings. The Experimental Group increased significantly in musical preference for both classical selections of Schubert and Brahms and decreased significantly in preference for both best-liked selections. The Control I Group increased significantly in preference for Brahms, showed a nonsignificant increase in preference for Schubert, and decreased significantly in preference for both best-liked selections. The Experimental Group increased significantly in discrimination of the Schubert and showed a nonsignificant increase in discrimination of the Brahms. The Experimental Group showed a nonsignificant increase in preference for classical music as tested by a pre-posttest. Using the null hypothesis, significance levels for each of the F tests were set at .05. For the Experimental Group, the correlation between discrimination of musical structure and musical preference was computed at .62 for the Schubert selection and .29 for the Brahms. Statistical analyses included treatments X subjects design, analysis of covariance, and product-moment coefficient of correlation.

Tabulation of 8,498 discriminations of the Schubert selection showed frequency of response to the structural elements to be ranked in the following order: instruments/voices, dynamics, melody, tessitura, tempi, harmony, form, instr./voc. techniques, rhythm, meter and mode. Out of 8,231 discriminations of the Brahms selection, response to the structural elements was ranked as follows: instruments/voices,

melody, dynamics, tessitura, instr./voc. techniques, harmony, tempi, form, rhythm, meter and mode. A combined discrimination frequency (18,728) of both best-liked selections resulted in a rank order of elements as follows: instruments/voices, melody, dynamics, harmony, form, rhythm, tessitura, instr./voc. techniques, tempi, meter and mode.

Some aftereffects of the experimental sessions were determined by a questionnaire sent to the Experimental Group subjects several weeks following the experiment.

Conclusions

1. The relationship between increased awareness of musical structure and affective response was found to be fairly high for a symphonic work by Schubert and moderately low for a symphonic work by Brahms.

2. There appeared to be no important relationship between discrimination of structural elements in popular music and preference for that music.

3. The subjects used in this study did not indicate extensive awareness of many different elements of structure. Of the 11 elements discriminated, instruments/voices, melody and dynamics comprised at least 75% of the total discriminations.

4. The discrimination task performed by the Experimental Group showed no significant effects on preference for classical music on the posttest.

5. The listening and discrimination treatments in this study appeared to establish some positive changes in listening habits among these subjects.

Recommendations for Further Study.

1. The discrimination task utilized in this study was basically a nondirective approach to music listening. Because the increase in affective response under such an approach was a significant one, further research should be undertaken to determine whether directed listening might increase awareness of structural characteristics and whether this approach would increase affective response.

2. Development of research techniques are needed for determining effects of specific elements of structure on affective response.

3. The posttest used in this study included musical excerpts which were only 30-40 seconds in length. Further research in this area should consider the use of musical excerpts of more similar length to the musical selections used in the discrimination sessions; this would allow the subjects to utilize more of their experience in discrimination of musical structure to affect their liking for the music.

4. Some use of the type of listening used in this study seems appropriate for teaching discriminative listening in the general music curriculum; this would need further researching to determine the feasibility of such a method.

Introduction

In recent years, much has been said about the necessity for improving the teaching of music in the public schools to produce students who can respond to music with greater aesthetic sensitivity. There has been, seemingly, an inability of many music teachers to instill in the majority of students an extensive appreciation for music, especially art music. Many educators believe that developing musically sophisticated students involves to a large extent increased awareness and understanding of the structural elements of music such as melody, harmony, rhythm and form.[1,2]

It seems reasonable to assume that knowledge of musical form and of the structural elements which make up that form is basic to musical understanding and, eventually, musical enjoyment. However, the relationship between liking a specific piece of music and understanding its composition is not always apparent. Causal relationships between a musical stimulus and a positive response to the stimulus are difficult to establish; but determining such relationships is important. The more that is known about creating positive reactions to music, the more likely will teaching methods be developed to better achieve these kinds of reactions.

Certain educators have indicated that one way to achieve greater sensitivity to these formal elements of structure is to find more effective ways of teaching discriminative listening.[3,4,5,6] In contrast to one who plays an instrument or sings, the majority of people will derive their pleasure from music largely as listeners. For the listener, then, aesthetic growth through music likely will be contingent to a great extent on his ability to listen with discrimination.

Discrimination of Musical Stimuli

To discriminate is to "distinguish . . . a sifting-out."[7] Webster's dictionary further defines discrimination as the "recognition, perception, or identification especially of differences."[8] Listening to music may occur with relatively little awareness of what is happening within the musical performance; however, listening attentively necessarily involves some degree of recognition, perception, or identification of musical stimuli by a process of distinguishing and sifting out certain stimulus characteristics.

The tonal and rhythmical structures of music include more than isolated elements; they include elements in complex melodic, rhythmic and harmonic patterns and relationships. To the person who is relatively unable to listen selectively to, or distinguish much of, the incoming musical stimuli, a musical performance may be no more than an undifferentiated mass of sound. This condition may be appropriate when music is used as a background for other activity, but the inability to listen with discrimination may be an impediment to more profound aesthetic experiences in music.

Discrimination and Repeated Listening

It is not always possible to make fine discriminations of music in one hearing; thus, appreciation for art music may be dependent not only on the ability of one to organize musical stimuli at the first hearing but, also, on the ability to make even finer discriminations upon repeated hearings of the music. Based on the writings of various persons, [9,10,11,12] music should have some interst for the listener as long as he can discriminate certain novelties in the music that arise out of variations on the familiar, and as long as these discriminations make music rewarding.

This would seem to explain why, in cases where such discriminations are not made, some individuals have difficulty maintaining interest in music of a "classical" nature. Generally, this kind of music utilizes the structural elements in such a way that unless one has acquired sufficient information concerning these elements, there may appear to be too many contrasting novelties presented in too rapid a succession. On the contrary, if the music is constructed too simply, one who has acquired sufficient information may quickly become satiated and even bored because of its lack of novelty. If it is true that "great music and music tending toward greatness exhibit much more subtlety both in the musical ideas themselves and in the treatment of the ideas,"[13] a listener will probably never appreciate a musical work for its greatness unless he is able to recognize, perceive, or identify many of the structural elements in their formal musical setting.

Related Research

Many of the research studies concerned with behavioral effects resulting from music listening have utilized repeated listenings to the same music. These studies have reported that in every case the repetition of a music listening experience tended, initially, to produce an increase in the degree to which that music was liked. Such response to music has been found to differ with different types of music, however, with positive affective shifts being associated generally with repeated listening to classical musical types and negative affective shifts being associated generally with popular musical types.

Gilliland and Moore[14] found that subjects rated two classical selections and two popular selections higher after the twenty-fifth hearing than after the first, with the classical pieces receiving the greater increase in preference. Downey and Knapp[15] found, also, that repeated hearings increased the pleasantness of musical compositions, and that the greatest gains were for the more "subtle" and "aesthetic" compositions. Verveer, Barry and Bousefield[16] concluded that two jazz selections increased in affective value up to an affective peak, after which pleasantness diminished progressively with further repetition. Washburn, Child and Abel[17] reported the same findings with the maximum preference

reached at an earlier time with popular than with classical compositions. Krugman[18] found that greater pleasantness occurred by the mere repetition of musical experience and that this was true for both classical and swing music. Mull[19] reported an increased enjoyment of modern music with repeated hearing. Getz[20] and Evans[21] showed that repeated listenings to music over a period of several weeks would result in increased preference for various types of classical music.

A few studies have attempted to show that affective and cognitive responses to music are not mutually exclusive behaviors but are merely different facets of a person's total behavior.[22,23,24] Some of these studies have reported conclusions which indicated important relationships between affective judgments and the predominance of certain basic musical components.

Studies by Mueller[25] and Duerksen[26] investigated the abilities of persons to recognize or discriminate certain musical components that are present in a musical composition. Apparently, the ability of many to discern elements of structure is limited to the most obvious, with little discernment of the more subtle musical characteristics being evident.

Some of the more recent studies have emphasized the importance of establishing relationships between discrimination of structural elements and affective response. Getz[27] reported there to be some relationship between familiarity, based on repeated listenings, awareness of the musical elements involved in the familiarization process, and affective response; although, this relationship was not a statistical one. Evans[28] found no relationship between awareness of formal structure and musical preference. He obtained this result by correlating scores on a test of musical knowledge with scores on musical preference. Even though the scores derived from these individual tests showed significant gains on a posttest, the scores of musical knowledge and musical preference did not correlate well each other.

One of the reasons for the lack of experimental studies dealing with musical discrimination is that music is a complex of many different stimuli which vary along several dimensions at once; thus, quantification of such discrimination data poses some difficulty. Certain studies have reported the existence of a relationship between stimulus complexity and affective response.[29,30,31] Some of the psychologists reporting the results of these studies have based their investigations on adaptation level theory.[32] This theory postulates that, after adaptation to (satiation of) a stimulus, minor deviations in the stimulus will tend to produce a positive affect; whereas, major deviations in complexity will tend to produce negative affect.

This theory would seem to have relevance for listening to music. Previous evidence has shown that initial hearings of music tend to produce positive affective response. If, upon repeated hearings, one could discriminate minor deviations of the stimulus elements (in the

form of new stimuli or variations of previously heard stimuli), perhaps positive affective response would be maintained over a longer period of time than when these minor deviations were not discriminated.

If it is true that interest in classical music and discrimination of structure are related positively, it would appear that this kind of relationship would hold, also, for types of music other than classical (i.e. popular). Considering, however, that most of these other musical types tend to be structured with less complexity than most classical music, interest in these types would tend, seemingly, to decrease more rapidly with repeated listening depending upon the extent to which one can discriminate and organize the musical stimuli.

Purpose of the Study

It was the purpose of this study to determine (1) whether the discrimination of structural elements would produce an increase in the preference for classical music, (2) whether this increase would be more apparent as a result of newly discriminated elements, or of variations of previously discriminated elements, and (3) what effect discrimination of structural elements would have on preference for best-liked music. From this investigation, answers were sought to the following specific questions:

1. To what degree are university nonmusic students able to discriminate the structural elements in prescribed classical music, and in the type of music stipulated by each person as best-liked?

2. What structural elements will be most frequently and least frequently discriminated in two prescribed pieces of classical music?

3. What structural elements will be most frequently and least frequently discriminated in two prescribed pieces of best-liked music?

4. Will the structural elements most frequently and least frequently discriminated in classical music be the same as those elements most frequently and least frequently discriminated in best-liked music?

5. What change will occur in the preference for either of the prescribed pieces of classical music for either the Experimental Group or Control Group I during a series of repeated listenings to the same music? Will this change be significantly greater than zero?

6. What change will occur in the preference for either of the prescribed pieces of best-liked music for either the Experimental Group or Control Group I during a series of repeated listenings to the same music? Will this change be significantly greater than zero?

7. To what extent will the discrimination of structural elements be related to a shift in the preference for two prescribed pieces of classical music during a series of repeated listenings to the same music?

8. In what way will the discrimination of structural elements be related to a shift in the preference for two prescribed pieces of best-liked music during a series of repeated listenings to the same music?

9. To what extent, and in what way, will experience in the discrimination of structural elements influence the preference for classical music as shown in a preference posttest? Will the Experimental Group show a statistically significant increase in the preference for classical music as determined by the posttest?

10. In what way, and to what extent, will the effects of the listening and discrimination treatments influence the music listening habits of the subjects in the Experimental Group several weeks following the experiment?

Procedure

Introduction

Previous studies concerned with discrimination or recognition of complex musical stimuli have, for the most part, relied on verbal reports for yielding the basic test data. In most of these cases where the verbal report was used, the experimental design involved lists of words or statements which attempted to describe the musical characteristics being tested. With this list before him, the subject would then be asked to respond to specified music by checking the work or statement most appropriate to his reaction. The disadvantages in this design are apparent. First, the subject is not asked to respond until after the music has stopped. This procedure requires reading of the statement and then remembering the specific place in the music to which the statement refers. Second, the subject's attention may be directed to specific musical content of which he actually was not aware at the time. Third, a true test of discrimination would be more like that which

> allows awareness to emerge without any direct hint from the examiner that the object or phenomenon exists . . . . Directing the student in the test situation to [specific] characteristics makes him, by definition, aware of them.[33]

Because the verbal report is still one of the most productive ways to obtain data regarding the discrimination of complex musical stimuli, some way must be found to yield data which, as nearly as possible, are an accurate description of the subject's immediate discrimination of the music. However, the responses must be contingent upon objective, rather than subjective, phenomena. They must be based on that which is really present in the music and not what the subject "imagines" to be present.

By having the subject speak into a tape recorder while listening to the music, he should be able to report spontaneously many of those musical stimuli that are distinguishable to him. Data could then be obtained which is more likely to reveal the individual's ability to discriminate

immediately the structural elements of music. In addition, some method of tabulating and evaluating these discriminations would have to be developed if one is to measure whether the ability to discriminate is related to the affective response of the music being heard.

Music Preference Test

A music preference test was constructed to aid in selection of the population sample by indicating those persons whose best-liked music was neither classical nor light classical, and to determine each subjects's best-liked type of music. Based on previous studies utilizing self-constructed music preference tests and on current musical types which are in vogue, a list of musical categories representing general classes of music was derived. These musical categories include: (1) serious classical, (2) light classical, (3) broadway show tune, (4) ballad, (5) jazz, (6) contemporary rock 'n' roll, (7) folk, and (8) country-western.

The number of musical items which should be included in the test was contingent upon establishing a proper length of time for its administration and upon selecting as many items as possible to adequately represent the musical category. As a result, seven different musical excerpts were selected for each of the eight categories, each excerpt lasting from 30 to 40 seconds.

The excerpts representing serious classical, light classical, and jazz were all instrumental arrangements. The excerpts representing broadway show tune, ballad, and country-western were part instrumental and part vocal with instrumental accompaniments. The remainder, including rock 'n' roll and folk, were vocal with appropriate instrumental accompaniments.

Using vocal music in a preference test may seem to distort a true measure of musical likes and dislikes because of the varied reactions to certain kinds and styles of vocalists. However, much of the music commonly heard today is seldom in any form but vocal. By utilizing a variety of examples within each category, it was hoped that a fairly accurate picture of musical preference would result. It may appear, also, that seven examples of serious classical music could not possibly account for the various periods and styles of this broad category. However, the purpose of this study did not require a complete representation of "classical" music and, therefore, only a representative group of selections reflecting the kinds of "classical" music to be used in the experimental sessions was included. Finally, because stimulative and sedative types of music elicit particularly strong differences in response, an attempt was made to include an equal number of these selections where appropriate in each category. Rock 'n' roll music, for example, is characteristically stimulative; therefore, all seven selections are stimulative types.

Using a table of random numbers, the excerpts were arranged in random order and tape recorded with a 10-second interval of silence between each interval of music. As a check to increase the assurance that each

of the items was correctly categorized, three experienced music teachers (judges) were given paper materials on which were listed the eight musical categories and a sequence of numbers from 1 to 56. Seated in an acoustically-treated room, the three judges listened to the programmed tape and, after the playing of each excerpt, checked the category which they individually believed most appropriate for that particular excerpt.

The results of the judges showed complete agreement with the investigator on 45 of the 56 items. Two out of three of the judges agreed on four items, and one, or all, of the three disagreed with the investigator on seven items. These seven items were then discarded as not being properly classified and were replaced with seven other selections which, based on the thinking of the three judges, would better represent the particular musical types involved.

As a further check to determine whether the musical excerpts were categorized correctly, three different experienced music teachers also were instructed to listen to the programmed tape in the same setting. This time, however, the judges were not given a prelisting of the eight established categories. Instead, each judge was asked to place the excerpts into musical types of his own choosing. The results of this session showed that in all cases the judges listed the same general categories as were established previously.

As a result, the test proper is approximately 44 minutes in length. With additional instructions and one musical example, the length of the total test is about 47 minutes (see Appendix A).

Following is a final listing of the musical works from which the excerpts were abstracted.

Serious Classical:

1. Symphony No. 4, Fourth Movement, by Schumann
2. Symphony No. 8, Second Movement, by Schubert
3. Symphony No. 40, First Movement, by Mozart
4. Symphony No. 1, Second Movement, by Brahms
5. Symphony No. 3, First Movement, by Beethoven
6. Symphony No. 4, Third Movement, by Mendelssohn
7. Symphony No. 104, Second Movement, by Haydn

Light Classical:

1. "The Young Prince and the Young Princess," from Scheherezade, by Rimsky-Korsakov
2. The Merry Wives of Windsor by Nicolai
3. Symphony No. 6, Second Movement, by Tchaikovsky
4. "Pas de deux, Variation I," from Swan Lake, Act III, by Tchaikovsky
5. Hungarian Dance No. 1 Brahms
6. The Moldau by Smetana
7. "Farandole," from L'Arlesienne Suite No. 2, by Bizet

Broadway Show Tune:

1. "Hello, Dolly," from Hello Dolly, by Herman
2. "One Hand, One Heart," from West Side Story, by Bernstein and Sondheim
3. "I'm in Love With a Wonderful Guy," from South Pacific, by Rodgers and Hammerstein
4. "On the Street Where You Live," from My Fair Lady, by Lerner and Loewe
5. "I Could Have Danced All Night," from My Fair Lady, by Lerner and Loewe
6. "We Kiss in a Shadow," from The King and I, by Rodgers and Hammerstein
7. "My Favorite Things," from The Sound of Music, by Rodgers and Hammerstein

Ballad:

1. "Slowly" by Soloman and Harbach, from the album Deep Velvet, by George Shearing
2. "In the Still of the Night" by Porter, from the album Night and Day and Other Favorites, recorded by Joel Herron
3. "Misty" by Garner, from the album Today's Romantic Hits for Lovers Only, recorded by Jackie Gleason
4. "Body and Soul" by Hayman and Eyton, from the album Today's Romantic Hits for Lovers Only, recorded by Jackie Gleason
5. "Emily" by Mercer and Mandel, from the album Dear Heart, recorded by Andy Williams
6. "More" by Newell, Ortolani and Oliviero, from the album Love Him, recorded by Doris Day
7. "Fly Me to the Moon" by Howard, from the album The Songs I Love, recorded by Perry Como

Jazz:

1. "Alone Together" by Schwartz and Dietz, from the album Paul Desmond--Take Ten
2. "Kissin' Bug" by Strayhorn, Stewart and Sherrill, from the album Bill Holman in a Jazz Orbit
3. "Nightfall" by Carter and Kurtz, from the album Deep Velvet, recorded by George Shearing
4. "Memories of You" by Razaf and Blake, from the album The Great Benny Goodman
5. "Song of the Wanderer" by Moret, from the album [illegible] Fountain's Music from Dixie
6. "P.S. I Love You" by Mercer and Jenkins, from the album Les Brown's in Town
7. "A Change of Pace" by Edison and Woods, from the album The Birth of a Band, recorded by Quincy Jones

Contemporary Rock 'n' Roll:

1. "My Obsession" by Jagger and Richards, from the album Between the Buttons, recorded by The Rolling Stones
2. "Who's Been Sleeping Here" by Jagger and Richards, from the album Between the Buttons, recorded by the Rolling Stones
3. "Hold On" by Sloan, from the album Hold On, recorded by Herman's Hermits
4. "If I Needed Someone" by Harrison, from the album The Beatles Yesterday and Today
5. "Time Changes Things" by Holland, Bradford and Dozier, from the album Meet the Supremes
6. "Forget That Girl" by Hatlelid, from the album The Monkees' Headquarters
7. "You Just May Be the One" by Nesmith, from the album The Monkees' Headquarters

Folk:

1. "Tommorrow is a Long Time" by Dylan, from the album Four Strong Winds, recorded by Ian and Sylvia Fricker
2. "Where Have All the Flowers Gone" by Seeger, from the album Folk Song Book, recorded by Eddy Arnold
3. "This Train" by Yarrow, from the album In the Wind, recorded by Peter, Paul and Mary
4. "Hush-A-Bye" by Harrow and Stookey, from the album In the Wind, recorded by Peter, Paul and Mary
5. "Turtle Dove" (Anonymous), from the album Leon Bibb Sings Folk Songs
6. "Peter Gray" (Anonymous), from the album The Wayfaring Stranger, recorded by Burl Ives
7. "Mo Mary" (Anonymous), from the album Folk Songs and Ballads, recorded by Richard Dyer-Bennett

Country-Western:

1. "No One to Cry To" by Willing and Robin, from the album The Sons of the Pioneers
2. "Hey Mister Bluebird" (Anonymous), from the album The Monterey Brass Goes Country and Western
3. "Chained to a Memory" by Carson, from the album Songs Everybody Knows, recorded by Red Foley
4. "You Gotta Have Love" by Nash and Atkins, from the album You Gotta Have Love, recorded by Eddy Arnold
5. "Meet Me Tonight in Laredo" by Cordle and Robinson, from the album The Drifter, recorded by Marty Robbins
6. "Don't Rob Another Man's Castle" by Carson, from the album Country Hits, Feelin' Blue, recorded by Ernie Ford
7. "Shame On You" by Cooley, from the album Red Foley

Validity and Reliability of the Preference Test

Two major problems which must be faced when developing a testing device concern its validity and reliability. Some indication must be given that the test is measuring what it is supposed to measure and that it will measure with consistency when given repeatedly. Determining the validity of a music preference test poses some difficulty, however, because there is no criterion measure with which to compare the test results. After an individual states his preference for a musical selection, it can only be accepted that the test did, in fact, measure his preference for that music. Thus, the best measure of validity which seemingly could be applied to the preference test in this study would appear to be face validity.

However, content validity, a validation measure similar to face validity but requiring more detailed examination, also was used to increase the assurance that the test items were relevant to the purposes of the test. In a discussion of content validity by Kerlinger, it is reported that a joint committee of the American Psychological Association, the American Educational Research Association, and the National Council on Measurements Used in Education defines content validity as the "representativeness or sampling adequacy of the content . . . of a measuring instrument."[34] Kerlinger points out that "content validation . . . is basically judgmental. . . . each item must be judged for its presumed relevance to the property being measured. . . ."[35] By having qualified persons make judgments on the representativeness of each musical item, it can be said that content validity, preferred to face validity, has been used to validate this test of musical preference.

Reliability for each subtest or musical category was established by the test-retest method, using the Pearson product-moment coefficient of correlation. The test was given to 48 students enrolled in first-year psychology classes at the University of Kansas. Students were asked to sign up for this series of two sessions only if they were nonmusic majors and if they were not presently enrolled in a music course. Therefore, the subjects were obtained from the same population that was utilized in the major study. The primary purpose for establishing reliability of this test was so the test could be used as a posttest for further evaluation of the experimental treatment.

The results of the reliability tests showed correlation coefficients as follows: (1) serious classical, $r = .71$; (2) light classical, $r = .59$; (3) broadway show tune, $r = .87$; (4) ballad, $r = .82$; (5) jazz, $r = .92$; (6) folk, $r = .79$; (7) country-western, $r = .84$; (8) contemporary rock 'n' roll, $r = .58$. Guilford recommends that for tests to be considered reliable, they should yield coefficient values of .70 to .98.[36] Two subtests, light classical and rock 'n' roll, did not yield reliability coefficients in that range. Of primary importance, however, is the fact that the musical subtest serious classical did achieve an acceptable correlation value of .71.

Only the serious classical subtest from the music preference test was used in a test of covariance involving all three groups of subjects; therefore, the reliability coefficients obtained from the test-retest method were considered acceptable for this experiment.

Music for the Listening Sessions

The music chosen for the major experimental portion of this study included two selections of "classical" music and two selections representing each category of best-liked music as determined by the preference test. Each of the selections was approximately two minutes in length; none of these selections were used in the preference test. The classical pieces were taken from the first movement of Symphony No. 5 by Schubert and the second movement from Symphony No. 4 by Brahms.

The Schubert work commences at the beginning of the movement and ends after 117 measures; this includes the entire exposition. The orchestration consists of flutes, oboes, bassoons, horns and strings. The tempo is allegro, alla breve, and the style is a "typical" eighteenth-century classical symphony. The music of Brahms was abstracted from the middle of the movement and includes 22 measures, commencing with measure 30. The orchestration consists of flutes, oboes, clarinets, bassoons, horns, trumpets, and strings. The tempo is a moderately slow 6/8 and the style is "typically" nineteenth-century romantic.

The remaining musical selections included works representing broadway show, ballad, jazz, folk, country-western, and rock 'n' roll. The category light classical was not used for discrimination purposes but was utilized in the preference test primarily to increase the probability that subjects would not be selected whose best-liked music was classical. Each subject, then, listened to the same four selections throughout the listening sessions, two prescribed classical pieces and two pieces which represented the subject's best-liked music. The following best-liked selections were chosen to be used in the listening sessions.

Broadway Show Tune:

1. "Hello Young Lovers," from The King and I, by Rodgers and Hammerstein
2. "Bali Ha'i," from South Pacific, by Rodgers and Hammerstein

Ballad:

1. "I'm in the Mood for Love" by McHugh and Fields, from the album Music for Lovers Only, recorded by Jackie Gleason
2. "Almost There" by Keller and Shayne, from the album Dear Heart, recorded by Andy Williams

Jazz:

1. "Count's Place" by Count Basie, from the album Count Basie and Kansas City 7
2. "The Gypsy" by Woods and Liston, from the album The Birth of a Band, recorded by Quincy Jones

Folk:

1. "Sinner Man" by Okun, from the album Leon Bibb Sings Folk Songs
2. "Four Strong Winds" by Fricker, from the album Four Strong Winds, recorded by Ian and Sylvia Fricker

Country-Western:

1. "Have I Told You Lately That I Love You" by Wiseman, from the album You Gotta Have Love, recorded by Eddy Arnold
2. "Tall Handsome Stranger" by Dorrough, from the album The Return of the Gunfighter, recorded by Marty Robbins

Contemporary Rock 'n' Roll:

1. "Got a Feeling" by Karger, Weisman and Wayne, from the album Hold On, recorded by Herman's Hermits
2. "Day Tripper" by Lennon and McCartney, from the album The Beatles Yesterday and Today

Classification and Scoring of Verbal Responses

It was expected that the responses to the music would include statements about melody, rhythm, harmony, form, instruments and other elements of structure. A list of specific structural elements was derived which would serve to classify the various discriminations. Three elements—melody, rhythm and instruments—were divided into two distinct categories to create a more sophisticated classification of these most fundamental factors of musical structure. The category "form" refers to those discriminations such as first theme, transition, verse, introduction and so forth (the selections included in the experiment generally were not of sufficient length to be heard as a compositional whole). The derived list of structural elements is as follows:

1. Melodic material
2. Melodic material in repeated or altered form
3. Metronomic rhythm
4. Specific rhythm patterns or rhythmic play
5. Meter
6. Tempi
7. Dynamic levels and their nuance
8. Families of instruments or voices

9. Specific instruments or voices
10. Instrumental or vocal techniques
11. Mode
12. Harmonic structure
13. Form
14. Tessitura

After tabulating the frequency of responses into each classification, a numerical value of "1" was given to that element most frequently discriminated by the group, a value of "2" to the next most frequently discriminated element, and so on to the least frequently discriminated element which was given a value of "14."

Using these numerical values, each subject received a discrimination score. The score consisted of his total discrimination performance, which included both newly discriminated, or variations of previously discriminated, elements, and responses which were merely repeated discriminations of elements once heard and reported. In order to differentiate the quality of these two kinds of responses, a point system was derived which would show not only differences in new or repeated responses but, also, one that would indicate "nearly correct" and "incorrect" responses. For example, if the subject reported hearing a flute when no flute was playing, the response would be incorrect and no tabulation made. If he reported hearing a flute and the instrument was a clarinet or some other woodwind instrument pitched closely to the flute, some credit should be given for making a discrimination of a structural component, even though the response was not quite accurate. This method of scoring "nearly correct" responses, though approved by this investigator's advisor, was performed only by the investigator and required at times merely arbitrary judgments. The point system was established as follows:

Repeated response—2 points
Repeated response nearly correct—1 point
Repeated response incorrect—0 points
New response—3 points
New response nearly correct—2 points
New response incorrect—0 points

Discrimination scores were computed by multiplying the number of discriminations in each structural classification by the derived point totals and then by the respective numerical value attributed to each element of structure. For example, if the classification "dynamic levels" was, according to group response, the second most frequently discriminated element, it would receive a value of "2." If a subject made five correct responses to this element during one hearing, with two of the five being new responses, a score for that particular element for one hearing would be 24 (3 repeated responses x 2 points x the value of the element—2 = 12; 2 new responses x 3 points x the value of the element—2 = 12). By summing the various scores computed for each element, total discrimination scores were achieved for each selection of each listening session.

Subjects

The subjects were students obtained from first-year psychology classes at the University of Kansas. These students were not enrolled in the university as music majors nor were they presently enrolled in any music course. Approximately 190 students from this population were chosen at random and given a test of musical preference. The test was given in a large lecture hall at two different sessions to accommodate the total group. The test, described previously, was given to identify those students whose best-liked music was any music other than that classified as serious classical or light classical.

One hundred fifty-five of the 190 students were accepted as subjects. These 155 subjects, comprising the population sample, were then divided randomly into three groups, Experimental, Control I and Control II. Although these subjects were not enrolled in music, it was anticipated that many of them would have musical backgrounds varying both in number of years and quality of experience. Randomization of the population sample supposedly helped to distribute this variable evenly among the three groups. At the completion of the experiment, the Experimental and Control I groups each consisted of 49 subjects and the Control II Group consisted of 51 subjects. The purpose for including three groups of subjects was to supply a control group (Control II) that neither performed the discrimination task nor listened to any music aside from the pretest and posttest.

The total statistics of the sample used in this study shows 62 men and 87 women with ag of 17 (12 persons), 18 (99 persons), 19 (22 persons), 20 (10 persons), 21 (3 persons), 22 (1 person), 23 (1 person) and 24 (1 person). One hundred fourteen were freshmen, 21 were sophomores, 10 were juniors and 4 were seniors. Those subjects who completed the experiment (149) were given two credits toward fulfillment of psychology research requirements. In addition, the subjects in the Experimental and Control I groups each were paid ten dollars for attending the many sessions required for this experiment.

Experimental Procedure

Although the experiment ran for five successive weeks, it was considered a two-part experiment with the major portion of the testing (Part One) performed during the middle three weeks. The first week was utilized to administer the music preference test for the purpose of establishing the population sample. The test was recorded on No. 203 Scotch Brand recording tape and played to the subjects on a Roberts Model 1650 tape recorder using two Model 20 KLH speakers. Additional purposes for this test were to determine best-liked types of music for each subject and to derive preference ratings for seven different excerpts of serious classical music. These ratings were used, together with posttest ratings, to determine the extent to which the experimental treatments would effect changes in the Experimental Group in its preference for classical music as compared to the other two groups.

The second, third and fourth weeks of the experiment were called Part One and involved two groups, Experimental and Control I. Each subject in these two groups listened to approximately 16 minutes of music, 3 times a week for 3 weeks. The music used was of two types, that termed classical and that termed best-liked. The classical music consisted of two different musical excerpts taken from orchestral works by Schubert (first movement of the Fifth Symphony) and Brahms (second movement of the Fourth Symphony), each about two minutes in length. The second type of music consisted of two selections, also two-minute excerpts, representing a stipulated type of best-liked music determined by the initial preference test. Neither the titles of these selections nor the composers were related to the subjects at any time during the experiment.

Of the eight musical categories represented in the preference test, only six, broadway show, rock 'n' roll, ballad, folk, jazz, and country-western, were used as best-liked types of music during the three-week period. The remaining two categories, serious classical and light classical, were not used during this period to represent best-liked music because the criteria for selecting the population sample necessitated the exclusion of those persons whose best-liked music was of the serious or light classical types.

Of the 98 total subjects in the Experimental and Control I groups, 32 liked broadway show music best, 29 liked rock 'n' roll music best, 17 liked ballad music best, 12 liked folk music best, 6 liked jazz music best, and 2 liked country-western music best. There were no subjects in the Control I Group whose best-liked music was country-western.

At the first session of Part One for Control Group I, the subjects heard each of the four pieces of music introduced in random order and, after the completion of each, were asked to rate their preference for the music on a nine-point scale ranging from "Dislike Very Much" to "Like Very Much." This initial rating represented a baseline for preference. At the second session, and at subsequent sessions, the subjects heard the same four selections played in the same order but a preference rating was not required; however, the four selections were played again, commencing immediately after the completion of the first playings, at which time a rating was required for each selection.

At the beginning of the second week of testing, the order was changed in which the four pieces of music were played. At the beginning of the third week, this order was changed back to the original presentation. The music was recorded on No. 150 Scotch Brand recording tape and played for the subjects on a Roberts Model 1650 tape recorder through a McIntosh high fidelity sound system. By the end of the experiment, each subject listened to each of the four selections a total of 17 times and rated each selection 9 times.

The subjects in the Control I Group were tested in groups of two to five. The testing took place in a university classroom. Seated at tables, each subject was hidden from the view of each other subject by use of specially designed partitions. This testing was given in the evenings to avoid being bothered by between-class movement outside the room. As much as possible, each subject was isolated for private listening. Instructions to the Control I subjects consisted of asking them to listen attentively to each musical selection; then, when appropriate, they were asked to listen attentively again to each selection after which they were to rate how much each selection was liked.

The subjects in the Experimental Group were tested individually in an acoustically treated room. As in Control Group I, each subject listened to and rated the same classical music and the same appropriate best-liked music. These ratings were required at the first session and at the second hearings of each subsequent session. In addition, each subject was required to speak into a microphone, during those times when he was not required to give a rating, for the purpose of tape recording his verbal responses. Any structural element present in the music which could be discriminated and verbalized in some manner was considered a valid response. A sample of the instruction sheet given to each subject in this group is found in Appendix B. The instruction sheet was read by each subject at the beginning of each week.

For the purpose of this study, the structural elements include those listed on page 12. The subject, then, could report hearing a certain melody, rhythm, repeated theme, instrument, or various other structural features in the music. These verbal responses were classified and scored according to the process described on page 13.. Similarly to Control Group I, the order in which the four pieces of music were played was changed each week. Also, the music was played from a tape recorder through a high fidelity sound system. By the end of the experiment, each subject listened to each of the four selections a total of 17 times, verbalized about each selection 8 times and rated each one 9 times.

Part Two of the study involved all three groups, Experimental, Control I and Control II. These groups were given a music preference posttest which, for Control II, was the only treatment condition aside from the pretest. The test was given during the fifth week after completion of Part One of the experiment and, like the pretest, was given in a large lecture hall at two different sessions.

Results

Introduction

For expediency in presentation and analysis of the data, the experimental procedure was designed to be explicated in two different parts. Part One of the experiment utilized two groups of subjects—Experimental and Control I. Data obtained from these groups consist of (1) musical preference ratings indicating affective responses to four musical selections, (2) discrimination scores derived from verbal reports by the Experimental Group concerning the structural elements of two "classical" selections, and (3) numerical compilations showing discrimination frequency of the structural elements in four musical selections.

Part Two of the experiment involved three groups of subjects—the Experimental and Control I groups used in Part One and an additional group termed Control II. Data from these groups consist of preference ratings obtained from a music preference pretest and posttest.

In addition, data will be presented showing some aftereffects of the experiment related to the listening sessions. This data consists of answers to a questionnaire obtained from the subjects in the Experimental Group two months following the experiment.

Part One Data

Nine preference ratings (one rating per session) were obtained for each of the four selections for each subject. The ratings for all subjects within each group were averaged to obtain a mean rating for each session. These ratings for the Experimental and Control I groups are presented in Tables 5 and 6 which are located in Appendix C. The treatments X subjects design was employed to determine statistical significance of the affective changes (indicated by preference ratings). Table 1 summarizes these results for the Experimental Group. Using the null hypothesis, significance levels for each of the F tests were set at .05. In each case the derived F value was statistically significant.

TABLE 1

TREATMENTS X SUBJECTS SUMMARY TABLE FOR AFFECTIVE SHIFTS: EXPERIMENTAL GROUP

Musical Selection	Source of Variance	df	Sum of Squares	Mean Square	F	P
Best-Liked No. 1	Treatments	8	17.1065	2.1383	5.1964	<.005*
	Subjects	48	879.4240	18.3213		
	Interaction	384	158.0046	.4115		
	Total	440	1054.5351			
Best-Liked No. 2	Treatments	8	50.4490	6.3061	9.7906	<.005*
	Subjects	48	716.4671	14.9264		
	Interaction	384	247.3288	.6441		
	Total	440	1014.2449			
Schubert	Treatments	8	19.2698	2.4087	3.5323	<.005*
	Subjects	48	1487.1383	30.9820		
	Interaction	384	261.8413	.6819		
	Total	440	1768.2494			
Brahms	Treatments	8	23.4466	2.9308	.5937	<.005*
	Subjects	48	1503.7778	31.3287		
	Interaction	384	244.9978	.6380		
	Total	440	1772.2222			

*Statistically significant

Table 2 summarizes the statistical computations for the Control I Group. Significance was established for all but the Schubert selection.

In Appendix C, Tables 7 and 8, are found the frequency of discrimination responses made by the Experimental Group for each element of structure for each classical selection; and the frequency of repeated and new discriminations with the resulting discrimination scores. The treatments X levels design was employed to determine statistical significance of the increases in discrimination scores.

TABLE 2

TREATMENTS X SUBJECTS SUMMARY TABLE FOR AFFECTIVE SHIFTS: CONTROL I GROUP

Musical Selection	Source of Variance	df	Sum of Squares	Mean Square	F	P
Best-Liked No. 1	Treatments	8	24.8481	3.1060	5.0291	<.005*
	Subjects	48	1338.8889	27.8935		
	Interaction	384	237.1519	.6176		
	Total	440	1600.8889			
Best-Liked No. 2	Treatments	8	17.2018	2.1502	5.1354	<.005*
	Subjects	48	707.0385	14.7300		
	Interaction	384	160.7982	.4187		
	Total	440	885.0384			
Schubert	Treatments	8	4.8617	.6077	.5571	<.25**
	Subjects	48	1553.3288	32.3610		
	Interaction	384	418.9161	1.0909		
	Total	440	1977.1066			
Brahms	Treatments	8	20.1950	2.5244	2.6243	<.025*
	Subjects	48	1479.1700	30.8160		
	Interaction	384	369.3606	.9619		
	Total	440	1868.7256			

*Statistically significant
**Statistically nonsignificant

Table 3 summarizes these results using the null hypothesis; significance levels for each of the F tests were set at .05. Significant increase in discrimination scores was found for the Schubert selection but not for the Brahms.

TABLE 3

TREATMENTS X SUBJECTS SUMMARY TABLE FOR DISCRIMINATION SCORES: EXPERIMENTAL GROUP

Musical Selection	Source of Variance	df	Sum of Squares	Mean Square	F	P
Schubert	Treatments	7	115,423	16,489	6.7883	<.005*
	Subjects	47	2,671,638	56,843		
	Interaction	329	799,321	2,429		
	Total	383	3,586,383			
Brahms	Treatments	7	23,309	3,329	1.0972	<.25**
	Subjects	47	2,438,281	51,878		
	Interaction	329	998,354	3,034		
	Total	383	3,459,946			

*Statistically significant
**Statistically nonsignificant

The relationship between discrimination of structure, as scored, and affective response was computed by employing the product-moment correlation coefficient. Utilizing the raw scores obtained for preference and discrimination, a coefficient of .62 was computed in reference to the Schubert work, and a coefficient of .29 was computed in reference to the Brahms work.

Discrimination scores were not computed for the Experimental Group in relation to best-liked music because not all subjects heard the same music. The frequency of discrimination responses was tabulated, however, and these data are found in Appendix C, Tables 9 and 10.

Table 11 in this appendix includes the rank order in which the structural elements were discriminated in each selection.

Part Two Data

The pre-posttest mean preference ratings reported by each of the three groups are given in Table 12 of the appendix. The basic data used in the analysis of covariance are found in Table 13. Table 4 shows the results of the significance test for the analysis of covariance. At a confidence level of .05, the Experimental Group showed a nonsignificant increase in affective response to the classical music on the posttest.

TABLE 4

TEST OF SIGNIFICANCE FOR EQUAL MEANS

Source	df	Sums of Squares	Mean Square	F	P
Between	2	131.1735	65.5868	2.5460	<.10*
Within	145	3735.3166	25.7608		
Total	147	3866.4901			

*Statistically nonsignificant

Post-Treatment Data

Two months following completion of the experimental listening sessions, a questionnaire was sent to the 49 subjects in the Experimental Group. The questionnaire was used to obtain information about the effects of the listening and discrimination treatments on music listening habits at the time the questionnaire was answered. Forty-seven of the 49 subjects returned the questionnaire for a return of 96 percent. A sample of this questionnaire is shown in Appendix D. The results of the questionnaire are given below for questions numbered 2, 4, 5 and 7. These results consist of frequency of response for each possible answer.

Question No. 2: Are you listening to music more often now than you did before the experiment?

(a) No, listening less now than before (1)
(b) No, listening about the same now as before (29)
(c) Yes, listening a little more now than before (11)
(d) Yes, listening much more now than before (5)
(e) Not certain (1)

Question No. 4: If you answered "no" or "not certain" to question #2, are you, however, enjoying music more now even though you do not listen to music more?

(a) No, enjoying music less now than before (0)
(b) No, enjoying music about the same now as before (11)
(c) Yes, enjoying music a little more now than before (15)
(d) Yes, enjoying music much more now than before (3)
(e) Not certain (1)

Question No. 5: When you listen to music now, are you more aware of such characteristics (or structural elements) as melody, rhythm, instruments, harmony, repeated phrases, etc. than before the experiment?

(a) No, less awareness than before (0)
(b) No, about the same awareness as before (10)
(c) Yes, a little more awareness than before (27)
(d) Yes, much more awareness than before (9)
(e) Not certain (1)

Question No. 7: If you answered "yes" to question #5, does this increased awareness also increase your enjoyment of the music?

(a) No, awareness decreases enjoyment (0)
(b) No, awareness neither decreases nor increases enjoyment (4)
(c) Yes, awareness increases enjoyment a little (15)
(d) Yes, awareness increases enjoyment much (17)
(e) Not certain (0)

Questions No. 1 and 3 were included in the questionnaire in order to determine whether the subjects changed in the types of music to which they were listening. These results showed that 15 subjects were listening more to light classical music, and 5 subjects were listening more to serious classical music. Question No. 6 enabled the subjects to list those structural elements of which they were more aware when listening to music. These elements are listed below with the respective response frequencies.

(a) Melody—7
(b) Melody in repeated or altered form—21
(c) Beat—21
(d) Specific rhythm patterns or rhythmic interplay—15
(e) Meter—3
(f) Tempi—8
(g) Dynamic levels—20
(h) Families of instruments or voices—22
(i) Specific instruments or voices—18
(j) Instrumental or vocal techniques—21
(k) Mode—5
(l) Harmony—14
(m) Form—8
(n) Pitch (tessitura)—0

Conclusions

Answers to the Questions Posed

Specific questions were presented in relation to the purposes for undertaking this study. Answers to these questions are given in an attempt to provide some basic conclusions.

1. To what degree are university nonmusic students able to discriminate the structural elements in prescribed classical music, and in the type of music stipulated by each person as best liked?

   University students were able, in varying degrees, to discriminate certain elements of structure. The number of discriminations made by each subject in the Experimental Group ranged from 40-429 for best-liked selection No. 1, 40-395 for best-liked selection No. 2, 41-370 for the Schubert selection, and 28-353 for the Brahms selection; the average number of discriminations by each subject for each of the selections was approximately 191, 191, 173, and 168 respectively. Not all of the students indicated awareness of each structural element while listening repeatedly to the music. For best-liked selection No. 1, all 49 subjects reported awareness of "specific instruments or voices" and "melodic material," and 45 subjects reported awareness of "families of instruments or voices;" but only 17 subjects reported awareness of "rhythmic play," 8 subjects reported awareness of "meter," and 1 subject reported awareness of "mode." For best-liked selection No. 2, 48 subjects reported awareness of "specific instruments or voices" and "melodic material," and 45 subjects reported awareness of "families of instruments or voices;" but only 12 subjects reported awareness of "rhythmic play," 10 subjects reported awareness of "meter," and 1 subject reported awareness of "mode." For the Schubert selection, all of the 49 subjects responded to "specific instruments or voices" and "dynamics," while 48 subjects responded to "melodic material;" but only 18 subjects indicated awareness of "metronomic rhythm," 4 subjects indicated awareness of "meter," and no subjects seemed aware of "mode." For the Brahms selection, 48 subjects indicated awareness of "specific instruments or voices" and "melodic material," and 47 subjects indicated awareness of "dynamics;" but only 8 subjects indicated awareness of "meter," 13 subjects indicated awareness of "rhythmic play," and 2 subjects indicated awareness of "mode."

2. What structural elements will be most frequently and least frequently discriminated in two prescribed pieces of classical music?

   After combining discrimination frequencies of the two melodic elements, the two rhythmic elements, and the two instrumental/vocal elements (specific and family), the frequency ranking

in which structural elements were discriminated was, for the Schubert selection: "instruments/voices" (3,591),"dynamics" (2,022), and "melody" (1,467), ranked 1, 2, and 3, respectively; ranked 9, 10, and 11 were the elements "rhythm" (107), "meter" (19), and "mode" (0). The frequency ranking for the Brahms selection was: "instruments/voices" (3,745), "melody" (1,431), and "dynamics" (931), ranked 1, 2, and 3, respectively; ranked 9, 10, and 11 were the elements "rhythm" (82), "meter" (34), and "mode" (9).

3. What structural elements will be most frequently and least frequently discriminated in two prescribed pieces of best-liked music?

   Because response to the elements in the two selections of best-liked music was highly similar, the total frequencies of the respective categories of structural elements for both selections were summed. After combining discrimination frequencies of the two melodic elements, the two rhythmic elements, and the two instrumental/vocal elements (specific and family), the frequency ranking in which structural elements were discriminated was, for best-liked music: "instruments/voices" (9,628), "melody" (3,292), and "dynamics" (1,110), ranked 1, 2, and 3, respectively; ranked 9, 10, and 11 were the elements "tempi" (570), "meter" (78), and "mode" (7).

4. Will the structural elements most frequently and least frequently discriminated in classical music be the same as those elements most frequently and least frequently discriminated in best-liked music?

   The structural elements most frequently discriminated in classical music were nearly the same as those elements most frequently discriminated in best-liked music. Based on the total frequencies of both classical selections, the elements most frequently discriminated were: "instruments/voices" (7,336), "dynamics" (2,953), and "melody" (2, 898). Based on the total frequencies of both best-liked selections, the elements most frequently discriminated were: "instruments/voices" (9,628), "melody" (3,292), and "dynamics" (1,110). The elements least frequently discriminated in the classical music were: "rhythm" (189), "meter" (53), and "mode" (9). The elements least frequently discriminated in the best-liked music were: "tempi" (570),"meter" (78), and "mode" (7).

5. What change will occur in the preference for either of the prescribed pieces of classical music for either the Experimental Group or Control Group I during a series of repeated listenings to the same music? Will this change be significantly greater than zero?

   The Experimental Group responded to both the Schubert and Brahms selections with a generally gradual increase in musical preference over a series of 17 listenings conducted in 9 sessions for a period of 3 weeks. The group mean preference for the first listening of the Schubert selection was 6.06 on a 9-point rating scale. The last listening of the Schubert produced a group mean preference of 6.82, resulting in a positive affective shift of .76 of a rating. This positive shift was found to be significantly greater than zero at the

.05 level, with the derived F value exceeding the .005 level of confidence. The mean preference for the first listening of the Brahms selection was 6.12. The last listening of the Brahms produced a mean rating of 6.96, resulting in a positive affective shift of .84 of a rating. This positive shift was found to be significantly greater than zero at the .05 level, with the derived F value exceeding the .005 level of confidence.

The Control I Group responded to both the Schubert and Brahms selections with an increase in musical preference, but the increase was not as gradual over the nine sessions as for the Experimental Group. The group mean preference for the first listening of the Schubert selection was 5.45. The last listening of the Schubert produced a mean rating of 5.71, resulting in a positive affective shift of .26 of a rating. This positive shift was found to be not significantly greater than zero at the .05 level, with the derived F value exceeding the .10 level of confidence. The group mean preference for the first listening of the Brahms selection was 5.69. The last listening of the Brahms was 6.27, resulting in a positive affective shift of .58 of a rating. This positive shift was found to be significantly greater than zero at the .05 level, with the derived F value exceeding the .025 level of confidence.

6. What change will occur in the preference for either of the prescribed pieces of best-liked music for either the Experimental Group or Control Group I during a series of repeated listenings to the same music? Will this change be significantly greater than zero?

The subjects in the Experimental Group responded to their respective best-liked selections with a generally gradual decrease in musical preference over a series of 17 listenings conducted in 9 sessions for a period of 3 weeks. The group mean preference for the first listening of best-liked selection No. 1 was 7.78. The last listening of best-liked No. 1 was 7.39, resulting in a negative affective shift of .39 of a rating. This negative affective shift was found to be significantly greater than zero at the .05 level, with the derived F value exceeding the .005 level of confidence. The first listening of best-liked No. 2 produced a mean preference of 8.00. The last listening of best-liked No. 2 produced a mean preference of 7.18, resulting in a negative affective shift of .82 of a rating. This negative affective shift was found to be significantly greater than zero at the .05 level, with the derived F value exceeding the .005 level of confidence.

The subjects in the Control I Group responded to their respective best-liked selections with a generally gradual decrease in preference for best-liked No. 2 and a decrease, but a less gradual one, for best-liked No. 1. The group mean preference for the first listening of best-liked selection No. 1 was 7.31. The mean preference for the last listening session was 6.88, resulting in a negative affective shift of .43 of a rating. This negative affective shift was found to

be significantly greater than zero at the .05 level, with the derived F value exceeding the .005 level of confidence. The first listening of best-liked No. 2 produced a mean rating of 8.08. The last listening of best-liked No. 2 produced a mean rating of 7.65, resulting in a negative affective shift of .43 of a rating. This negative affective shift was found to be significantly greater than zero at the .05 level, with the derived F value exceeding the .005 level of confidence.

7. To what extent will the discrimination of structural elements be related to a shift in the preference for two prescribed pieces of classical music during a series of repeated listenings to the same music?

The discrimination of structural elements in the Schubert selection, as scored in this study, was found to correlate with a shift in preference for that selection at a coefficient of .62. In reference to the Schubert work, it can be stated that the variables musical preference and discrimination of musical structure share 38 percent commonality of variance. The discrimination of structural elements in the Brahms selection, as scored, was found to correlate with a shift in preference for that selection at a coefficient of .29. In reference to the Brahms work, it can be stated that the variables musical preference and discrimination of musical structure share 8 percent commonality of variance.

Further important relationships between preference and discrimination were shown in that significant treatment effects occurred for affective shifts between sessions 1 and 2 for the Experimental Group for both classical selections. At the second session, the Experimental Group began the discrimination task for the first time. The Control I Group did not show significant effects from treatments related to affective shift until between sessions 1 and 4. This analysis, using a t critical difference formula, is suggested by Lindquist.[37]

8. In what way will the discrimination of structural elements be related to a shift in the preference for two prescribed pieces of best-liked music during a series of repeated listenings to the same music?

There appeared to be no clearly established relationship between discrimination of structural elements in best-liked music and preference for that music.

9. To what extent, and in what way, will experience in the discrimination of structural elements influence the preference for classical music as shown in a preference posttest? Will the Experimental Group show a statistically significant increase in the preference for classical music as determined by the posttest?

Discrimination of structural elements had some effect on mean preference for serious classical music as categorized in the preference test. This effect was shown by a positive affective shift on the posttest of .34 of a rating for the Experimental Group. The Control I and Control II groups showed positive affective shifts

of .23 and .05, respectively. The shift in preference for the Experimental Group in comparison to the other two groups was found to be not statistically significant at the .05 level, with the derived F value exceeding the .10 level of confidence.

10. To what extent, and in what way, will the effects of the listening and discrimination treatments influence the music listening habits of the subjects in the Experimental Group several weeks following the experiment?

Two months following the completion of the experiment, questionnaires relating to the listening experiences were sent to the 49 subjects of the Experimental Group. A return of 96 percent of the questionnaires (47 subjects) was obtained. The results of the questionnaire were:

1. 16 persons (34%) were listening to music more than before the experiment (11 a little more; 5 much more).

2. 18 persons (39%) were not listening more but were enjoying music more than before the experiment (15 a little more; 3 much more).

3. 34 persons (72%) were in some manner enjoying music more than before the experiment (based on the results of the previous statements).

4. 36 persons (77%) were more aware of structural characteristics than before the experiment (27 a little more; 9 much more).

5. 32 persons (68%) said increased awareness of structural characteristics increased musical enjoyment (15 a little more; 17 much more).

6. 21 persons (45%) were listening more to serious and light classical music than before the experiment (5 serious classical; 15 light classical).

Implications and Recommendations

One of the fundamental concerns of this study was to determine whether greater awareness of musical structure would effect a greater liking for music. The results indicated that for one particular musical selection, a composition typical of the classical period, a fairly high relationship was established between such awareness and positive affective response. This relationship appears even more significant when considering that music in the classical style is not closely related to the musical tastes of today's university-age person. Certainly, the subjects in this study are enrolled in a university to better themselves culturally, as well as academically, and this desire to learn appreciation for works of art must be interpreted as a possible bias when examining the results. Nevertheless, if it is true that the Experimental and Control I groups were indeed randomly selected, then the influence of discrimination on musical preference seems apparent by the fact that the Control I Group

did not react as positively toward the music of Schubert as did the Experimental Group.

The relationship between awareness of structure and affective response for the Brahms selection was positive but too low to be accepted as an important one. Both the Experimental and Control I groups showed a greater increase in preference for the music of Brahms, a typically romantic composition in style, than they did for the music of Schubert. In addition, the two groups reacted more similarly to Brahms than to Schubert. It is likely, then, that the romantic music of Brahms, because it is closer to the musical tastes of the subjects used in this study, did not require as much discernment of musical structure to produce positive affective response.

It is apparent from just these two musical examples, that the teaching of different kinds of classical music may require different pedagogical methods. There would seem to be some question, for example, about the teaching of romantic-styled music in a purely academic setting.

If music educators believe that sensitive awareness of the structural elements of classical music is an important objective in music education, it is apparent from this study that these particular students, generally, did not reveal such awareness to any extent. Of the 11 structural elements listed in the corrected rank order tables, the first 3 elements (including instruments/voices, melody and dynamics) comprise 78 percent of the total discriminations of classical music and 75 percent of the total discriminations of best-liked music. The attention of the subjects, apparently, was directed relatively little to other aspects of musical structure. Upon checking the responses of individual subjects, it was found that fewer than half of the subjects reported awareness of rhythmic elements in either of the classical pieces, and most subjects seemed not to be aware of meter or mode. Lack of awareness was evident, also, in that many subjects reported few, or no, new discriminations of structure in the last few listening sessions.

Several subjects discriminated elements of harmony in the Brahms selection but not in the Schubert. For these subjects (15) the concept of harmony associated with the Brahms did not appear to transfer to the discrimination of harmonic structure in the Schubert; this was true for other elements as well. The implication from these results suggests that, in teaching elements of harmony in music, for example, the teacher should not assume that such learning will transfer to other music, especially if that music contains other elements of structure which have a stronger valence for the listener.

The discrimination task utilized in this study was basically a non-directive approach to music listening. The increase in affective response under such a listening approach was, for the Experimental Group, a significant one. Further research should be undertaken to determine whether directed listening might increase awareness of structural characteristics and whether this listening approach would increase affective response. Such research might yield additional objective evidence which would establish other, more meaningful, relationships

between discrimination of musical structure and preference for music.

Development of research techniques are needed, also, for determining effects of specific elements of structure on affective response. The absence of rhythmic response to the classical selections was quite extensive, with only 1 percent of the total discrimination responses related to rhythm. In comparison, the music students in a pilot study responded to elements of rhythm with much greater frequency. Of the total discriminations (4,984) made of the classical music by the music students, 709 (14 percent) were discriminations of rhythm. The rather large difference in response to rhythm, between students majoring in music and those not majoring in music, may be an important difference if it is related to positive reactions to classical music (and it would be assumed that music students generally are attracted to such music). It should be emphasized that in comparing the responses of the music and nonmusic students to most of the structural elements, only the element of rhythm showed such a large difference in discrimination frequency. If it could be determined that persons are, in fact, not aware of rhythmic elements in classical music, teaching methods could be developed to increase awareness for this and other elements which may be most directly related to affective response.

The results of the posttest showed that, in comparison to the other two groups, the Experimental Group did not increase significantly in preference for classical music; although, significance was approached. If further research in this area is undertaken, it is recommended that the posttest include musical excerpts of more similar length to the musical selections used in the listening sessions. The shortness of the musical excerpts (30-40 seconds) used in the preference test may not have allowed the subjects to utilize their experience in discrimination of musical structure to affect their liking for the music.

The questionnaire concerning the influence of the listening and discrimination treatments on post-treatment listening habits indicated some important effects resulting from the process of nondirective listening used in this study. The verbal approach is, of course, a method by which the individual is forced to think about what he is hearing; and there is no intention here of implying that this method be used for all music listening. These results do suggest, however, that some use of the type of listening used in this study would be appropriate for teaching discriminative listening in the general music curriculum; this would need further researching to determine the feasibility of such a method.

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APPENDIXES

Appendix A: Music Preference Test Rating Sheet

Name_____Sex_____Date_____

Major Course of Study_____Year_____Age_____

Address_____Phone_____

Instructions:

The purpose of this test is to determine what kinds or types of music you like and the degree to which you like them. You will hear a series of short, musical excerpts. After the completion of each excerpt, you are asked to rate how much you like that particular excerpt, to the best of your ability, by circling the appropriate number on the rating scale provided. Each scale consists of a number which corresponds with a degree of dislike or like. For example, if, after listening to a musical excerpt, you decide you "Like Mildly" that selection, then you should mark the appropriate rating scale in the following manner:

DISLIKE	1	2	3	4	(5)	6	7	LIKE
	Very Much	Moderately	Mildly	Neither	Mildly	Moderately	Very Much	

There will be a brief pause after each excerpt to mark your rating. Do Not attempt to change a previously marked rating. First, one musical example will be given to help your understanding of the procedure.

Example No. 1:

1. DISLIKE	1	2	3	4	5	6	7	LIKE
	Very Much	Moderately	Mildly	Neither	Mildly	Moderately	Very Much	

Now we will begin the test. Are there any questions?

Item:

1. DISLIKE	1	2	3	4	5	6	7	LIKE
	Very Much	Moderately	Mildly	Neither	Mildly	Moderately	Very Much	
56. DISLIKE	1	2	3	4	5	6	7	LIKE
	Very Much	Moderately	Mildly	Neither	Mildly	Moderately	Very Much	

Appendix B: Discrimination Task Instruction Sheet

Listening to music is a common, and usually enjoyable, activity. Yet many people are really not aware of the many and varied music characteristics which are present in a musical performance. It is the purpose of this listening session to determine if you can recognize, identify, or describe, to the best of your ability, any of the musical characteristics that are present in certain musical selections.

You will hear four musical selections. While you are listening to the music, you are asked to talk (verbalize) into the microphone placed before you, describing any musical characteristics you can hear. For example, you may hear certain instruments, in which case you may say, "I hear a trombone," etc. Or, you may recognize that a melody is being played. It is your task to talk about the things you hear. You may hear things that seem too obvious to mention, but DO NOT CONSIDER THAT ANYTHING YOU HEAR IS TOO OBVIOUS TO MENTION. You may hear something for the second time in the same piece of music but in a little different way; therefore, describe it. Try, also, to hear things not heard previously. If you cannot use musical terms, then use any terms that will help you in your description. Because it may be too easy to just sit back and listen, it may take extra effort to talk while the music is playing. It is important in this test that, to the best of your ability, you do verbalize and as continuously as seems feasible.

Please do not attempt to describe how the music makes you "feel" (sad, happy, etc.) or what it "means" to you, or that it reminds you of some picturesque scene. Make your verbalizations as objective as possible.

Are there any questions?

Remember to begin talking as soon as each number commences. We are ready to begin this part of the test. (Investigator will start the tape machine on the table.)

Appendix C: Group Preference Ratings

TABLE 5

MEAN PREFERENCE RATINGS OF THE EXPERIMENTAL GROUP FOR FOUR MUSICAL SELECTIONS OVER NINE LISTENING SESSIONS

Musical Selections	Listening Sessions									Affective Shift
	1	2	3	4	5	6	7	8	9	
Best-Liked No. 1	7.78	7.92	7.67	7.69	7.49	7.43	7.37	7.33	7.39	-.39
Best-Liked No. 2	8.00	8.06	7.69	7.65	7.35	7.24	7.14	7.20	7.18	-.82
Classical Schubert	6.06	6.49	6.38	6.39	6.55	6.61	6.49	6.73	6.82	+.76
Classical Brahms	6.12	6.45	6.59	6.71	6.67	6.80	6.73	6.82	6.96	+.84

Best-liked selection No. 1 includes all of the best-liked selections in each musical category that were presented first on the tapes in the testing situation. Best-liked selection No. 2 includes all of the best-liked selections that were presented second on the tapes.

Appendix C (Cont.): Group Preference Ratings

TABLE 6

MEAN PREFERENCE RATINGS OF THE CONTROL I GROUP FOR FOUR MUSICAL SELECTIONS OVER NINE LISTENING SESSIONS

Musical Selections	Listening Sessions 1	2	3	4	5	6	7	8	9	Affective Shift
Best-Liked No. 1	7.31	7.49	7.20	6.94	6.84	6.86	6.84	6.80	6.88	-.43
Best-Liked No. 2	8.08	8.04	7.88	7.78	7.76	7.60	7.51	7.53	7.65	-.43
Classical Schubert	5.45	5.76	5.67	5.61	5.57	5.59	5.84	5.61	5.71	+.26
Classical Brahms	5.69	5.65	5.94	6.22	6.18	6.08	6.00	6.20	6.27	+.58

Appendix C (Cont.): Discrimination Frequencies

TABLE 7

TOTAL FREQUENCY OF DISCRIMINATION RESPONSES MADE BY EXPERIMENTAL GROUP FOR EACH ELEMENT OF STRUCTURE IN CLASSICAL SELECTIONS

Structural Elements	Schubert			Brahms		
	No. S. Resp.	Freq. of Resp.	Freq. Rank	No. S. Resp.	Freq. of Resp.	Freq. Rank
1. Melodic Material	48	944	4	48	1096	2
2. Mel. Mat. Repeated	42	523	5	37	335	8
3. Metronomic Rhythm	18	41	12	21	50	11
4. Rhythmic Play	14	66	11	13	32	13
5. Meter	4	19	13	8	34	12
6. Tempi	40	344	7	44	326	9
7. Dynamics	49	2022	2	47	931	4
8. Fam. of Instr./Voices	44	1009	3	46	996	3
9. Spec. Instr./Voice	49	2582	1	48	2749	1
10. Instr./Voc. Techniques	29	149	10	42	422	6
11. Mode	0	0	14	2	9	14
12. Harmonic Structure	28	213	8	43	365	7
13. Form	40	195	9	36	135	10
14. Tessitura	36	391	6	42	751	5
Totals		8498			8231	

Appendix C (Cont.): Group Discrimination Scores

TABLE 8

FREQUENCY OF REPEATED AND NEW DISCRIMINATIONS
AND RESULTING DISCRIMINATION SCORES

		Discrimination Sessions								
Selections	D	2	3	4	5	6	7	8	9	Total
Schubert	Rep.	236	673	824	866	936	1072	1002	1087	6716
	New	442	249	230	199	153	105	126	119	1623
		678	922	1054	1065	1109	1177	1128	1206	8339
	Score	5451	6611	7446	7475	7922	7508	7822	8245	
Brahma	Rep.	226	602	802	873	906	966	978	1009	6450
	New	550	318	224	178	134	145	110	122	1781
		776	920	1026	1051	1040	1111	1088	1131	8231
	Score	7244	7682	8010	7879	7698	8238	7565	8515	

Appendix C (Cont.): Discrimination Frequencies

TABLE 9

TOTAL FREQUENCY OF DISCRIMINATION RESPONSES MADE BY SUBGROUPS WITHIN EXPERIMENTAL GROUP FOR EACH ELEMENT OF STRUCTURE IN BEST-LIKED SELECTION NO. 1

Structural Elements	Broadway N=19	Rock N=14	Ballad N=6	Folk N=4	Jazz N=4	Country N=2	Totals N=49
1. Melodic Material	469	308	153	43	93	42	1108
2. Mel. Mat. Repeated	120	243	43	5	29	14	454
3. Metronomic Rhythm	46	186	24	2	27	13	298
4. Rhythmic Play	51	15	0	0	20	4	90
5. Meter	25	8	3	0	0	5	41
6. Tempi	373	13	19	7	4	0	416
7. Dynamics	466	34	48	59	9	0	616
8. Fam. of Instr./Voices	569	199	70	22	17	18	895
9. Spec. Instr./Voice	1607	1219	373	187	335	96	3817
10. Instr./Voc. Techniques	50	121	0	26	62	32	291
11. Mode	1	0	0	0	0	0	1
12. Harmonic Structure	97	214	68	56	43	26	504
13. Form	182	217	7	9	5	13	433
14. Tessitura	228	46	38	11	53	12	388
Totals	4284	2823	846	427	697	275	9352

Appendix C (Cont.): Discrimination Frequencies

TABLE 10

TOTAL FREQUENCY OF DISCRIMINATION RESPONSES MADE BY SUBGROUPS WITHIN EXPERIMENTAL GROUP FOR EACH ELEMENT OF STRUCTURE IN BEST-LIKED SELECTION NO. 2

Structural Elements	Broadway N=19	Rock N=14	Ballad N=6	Folk N=4	Jazz N=4	Country N=2	Totals N=49
1. Melodic Material	580	293	126	49	36	48	1182
2. Mel. Mat. Repeated	168	259	72	24	11	14	548
3. Metronomic Rhythm	51	244	65	8	12	22	402
4. Rhythmic Play	14	15	1	0	3	1	34
5. Meter	21	4	4	0	6	2	37
6. Tempi	87	13	14	29	11	0	154
7. Dynamics	253	104	40	73	24	0	494
8. Fam. of Instr./Voices	462	240	125	93	28	15	963
9. Spec. Instr./Voice	1558	1382	504	140	266	103	3953
10. Instr./Voc. Techniques	121	82	15	18	33	25	294
11. Mode	0	0	0	6	0	0	6
12. Harmonic Structure	112	251	34	80	40	17	534
13. Form	209	161	11	12	6	6	405
14. Tessitura	243	49	34	9	12	23	370
Totals	3879	3097	1045	541	538	276	9376

Appendix C (Cont.): Discrimination Frequency Rank Order

TABLE 11

CORRECTED RANK ORDER OF STRUCTURAL ELEMENTS FOR CLASSICAL AND BEST-LIKED MUSIC BASED ON FREQUENCY OF DISCRIMINATION

Schubert		Brahms		Best-Liked 1 and 2	
Rank Order of Elements	Freq.	Rank Order of Elements	Freq.	Rank Order of Elements	Freq.
1. Instr./Vo.	3591	1. Instr./Vo.	3745	1. Instr./Vo.	9628
2. Dynamics	2022	2. Melody	1431	2. Melody	3292
3. Melody	1467	3. Dynamics	931	3. Dynamics	1110
4. Tessitura	391	4. Tessitura	751	4. Harmonic Struct.	1038
5. Tempi	344	5. Instr./Voc. Tech.	422	5. Form	838
6. Harmonic Struct.	213	6. Harmonic Struct.	365	6. Rhythm	824
7. Form	195	7. Tempi	326	7. Tessitura	758
8. Instr./Voc. Tech.	149	8. Form	135	8. Instr./Voc. Tech.	585
9. Rhythm	107	9. Rhythm	82	9. Tempi	570
10. Meter	19	10. Meter	34	10. Meter	78
11. Mode	0	11. Mode	9	11. Mode	7
Totals	8,498		8,231		18,728

The ranking was derived by combining the discrimination frequencies of the two melodic elements, the two rhythmic elements, and the two instrumental/vocal elements (specific and family).

Appendix C (Cont.): Pre-Posttest Ratings and Basic Data

TABLE 12

PRETEST-POSTTEST MEAN RATINGS FOR
SERIOUS CLASSICAL MUSIC

	Mean Ratings		Affective Shift
	Pretest	Posttest	
Experimental (N=49)	4.20	4.54	+.34
Control I (N=49)	4.00	4.23	+.23
Control II (N=51)	3.90	3.95	+.05

TABLE 13

BASIC DATA TABLE

Groups	N	x^2	y^2	xy
Experimental	49	5488.0000	4863.0612	4403.1429
Control I	49	3770.9796	3767.3878	3148.3673
Control II	51	4449.3333	5307.3333	4274.6667
Within		13708.3129	13937.7823	11826.1769
Between		113.4992	417.7613	214.4875
Total	149	13821.8121	14355.5436	12040.6644

Appendix D: Post-Treatment Questionnaire

QUESTIONNAIRE

Please indicate your response to each question by drawing a line around the answer which best represents your feelings.

Questions:

1. What kind/kinds of music did you most often listen to before the experiment?

   (a) Broadway (b) Jazz (c) Folk (d) Light Classical

   (e) Country-Western (f) Ballad (g) Serious Classical

   (h) Contemporary Rock 'n' Roll (i) Other_____(indicate)

2. Are you listening to music more often now than you did before the experiment?

   (a) No, listening less now than before
   (b) No, listening about the same now as before
   (c) Yes, listening a little more now than before
   (d) Yes, listening much more now than before
   (e) Not certain

3. If your listening habits have changed since the experiment in that you are listening more or less to certain kinds of music, indicate the direction of change (more or less) for that/those category/categories listed below by drawing a circle around the word "more" or "less" where appropriate.

   (a) Broadway Show—more-less (b) Jazz—more-less (c) Folk—more-less

   (d) Light Classical—more-less (e) Country-Western—more-less

   (f) Ballad—more-less (g) Serious Classical—more-less

   (h) Contemporary Rock 'n' Roll—more-less (i) Other_____more-less

4. If you answered "no" or "not certain" to question #2, are you, however, enjoying music more now even though you do not listen to music more?

   (a) No, enjoying music less now than before
   (b) No, enjoying music about the same now as before
   (c) Yes, enjoying music a little more now than before
   (d) Yes, enjoying music much more now than before
   (e) Not certain

Appendix D (Cont.): Post-Treatment Questionnaire

5. When you listen to music now, are you more aware of such characteristics (or structural elements) as melody, rhythm, instruments, harmony, repeated phrases, etc. than before the experiment?

   (a) No, less awareness than before
   (b) No, about the same awareness as before
   (c) Yes, a little more awareness than before
   (d) Yes, much more awareness than before
   (e) Not certain

6. If you answered "yes" to question #5, what element/elements of those listed below are you more aware?

   (a) Melody (b) Melody in repeated or altered form (c) Beat (rhythm)

   (d) Specific rhythm patterns or rhythmic play (e) Meter (4/4 time, etc.)

   (f) Tempi (fast-slow) (g) Dynamic levels (loud-soft)

   (h) Families of instruments or voices (strings, brass, group of singers, etc.)

   (i) Specific instruments or voices (violins, flutes, male vocalist, etc.)

   (j) Instrumental or vocal techniques (plucking strings, drum roll, humming, etc.)

   (k) Mode (major-minor) (l) Harmony (m) Form (introduction, first theme, verse, etc.)

   (n) Pitch (highness-lowness)

7. If you answered "yes" to question #5 does this increased awareness also increase your enjoyment of the music?

   (a) No, awareness decreases enjoyment
   (b) No, awareness neither decreases nor increases enjoyment
   (c) Yes, awareness increases enjoyment a little
   (d) Yes, awareness increases enjoyment much
   (e) Not certain